

**REMARKS**

In the Office Action, the Examiner rejected claims 30, 32-52, 54 and 55. By this paper, the Applicants hereby amend claims 30, 54 and 55 for clarification of certain features to expedite allowance of the present application. These amendments do not add any new matter. Upon entry of these amendments, claims 30, 32-52, 54 and 55 will remain pending in the present patent application and are believed to be in condition for allowance. In view of the foregoing amendments and the following remarks, the Applicants respectfully request reconsideration and allowance of all pending claims.

**Rejections Under 35 U.S.C. § 103**

The Office Action summarizes claims 30, 35, 36, 38-40 and 42-51 as being unpatentable over U.S. Patent No. 5,973,444 (hereinafter "Xu") in view of U.S. Patent No. 6,255,198 (hereinafter "Linthicum"). Further, the Office Action summarizes claim 32 as being unpatentable over Xu in view of Linthicum, and further in view of U.S. Patent No. 5,157,304 (hereinafter "Kane"). Further, the Office Action summarizes claim 33 as rejected under 35 U.S.C. §103(a) as being unpatentable over Xu in view of Linthicum, and further in view of U.S. Patent No. 6,054,801 (hereinafter "Hunt"). Also, the Office Action summarizes claim 34 as rejected under 35 U.S.C. §103(a) as being unpatentable over Xu in view of Linthicum, and in view of U.S. Patent No. 6,465,132 (hereinafter "Jin") taken with U.S. Patent No. 6,911,767 (hereinafter "Takai"). Furthermore, the Office Action summarizes claims 37 and 52 as rejected under 35 U.S.C. §103(a) as being unpatentable over Xu in view of Linthicum, and in further view of U.S. Patent No. 6,376,007 (hereinafter "Rowell"). Still further, the Office Action summarizes claim 41 as rejected under 35 U.S.C. §103(a) as being unpatentable over Xu in view of Linthicum, and in further view of U.S. Patent No. 6,586,093 (hereinafter "Laude"). Further, the Office Action summarizes claims 54 and 55 as rejected under 35 U.S.C. §103(a) as being unpatentable over Xu in view of U.S. Patent No. 5,406,123 (hereinafter "Narayan"). The Applicants respectfully traverse these rejections.

***Legal Precedent***

First, the pending claims must be given an interpretation that is reasonable and consistent with the *specification*. See *In re Prater*, 415 F.2d 1393, 1404-05, 162 U.S.P.Q. 541, 550-51 (C.C.P.A. 1969) (emphasis added); see also *In re Morris*, 127 F.3d 1048, 1054-55, 44 U.S.P.Q.2d 1023, 1027-28 (Fed. Cir. 1997); see also M.P.E.P. §§ 608.01(o) and 2111. Indeed, the specification is “the primary basis for construing the claims.” See *Phillips v. AWH Corp.*, No. 03-1269, -1286, at 13-16 (Fed. Cir. July 12, 2005) (*en banc*). One should rely *heavily* on the written description for guidance as to the meaning of the claims. See *id.*

Second, interpretation of the claims must also be consistent with the interpretation that *one of ordinary skill in the art* would reach. See *In re Cortright*, 165 F.3d 1353, 1359, 49 U.S.P.Q.2d 1464, 1468 (Fed. Cir. 1999); M.P.E.P. § 2111. “The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation.” See *Collegenet, Inc. v. ApplyYourself, Inc.*, No. 04-1202, -1222, 1251, at 8-9 (Fed. Cir. August 2, 2005) (quoting *Phillips*, No. 03-1269, -1286, at 16). The Federal Circuit has made clear that derivation of a claim term must be based on “usage in the ordinary and accustomed meaning of the words amongst artisans of ordinary skill in the relevant art.” See *id.*

Third, the burden of establishing a *prima facie* case of obviousness falls on the Examiner. See *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. See *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. See *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir.

1990). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). The Examiner must provide objective evidence, rather than subjective belief and unknown authority, of the requisite motivation or suggestion to combine or modify the cited references. *In re Lee*, 61 U.S.P.Q.2d. 1430 (Fed. Cir. 2002). Moreover, a statement that the proposed modification would have been “well within the ordinary skill of the art” based on individual knowledge of the claimed elements cannot be relied upon to establish a *prima facie* case of obviousness without some *objective reason to combine* the teachings of the references. *Ex parte Levengood*, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993); *In re Kotzab*, 217 F.3d 1365, 1371, 55 U.S.P.Q.2d. 1313, 1318 (Fed. Cir. 2000); *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 50 U.S.P.Q.2d. 1161 (Fed. Cir. 1999).

Fourth, when prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). The Federal Circuit has warned that the Examiner must not, “fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.” *In re Dembiczak*, F.3d 994, 999, 50 U.S.P.Q.2d 52 (Fed. Cir. 1999) (quoting *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983)).

Fifth, it is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983); M.P.E.P. § 2145. Moreover, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (CCPA 1959); *see* M.P.E.P. § 2143.01(VI). If the proposed modification or combination would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); *see* M.P.E.P. § 2143.01(V).

***Cited references, taken alone or in hypothetical combination, fail to teach or suggest a “conductive epitaxial buffer layer” as recited by independent claim 30.***

Independent claim 30 recites a “conductive epitaxial buffer layer affixed to the top side of the substrate.”

The Xu and Linthicum references, taken alone or in hypothetical combination, fail to teach or suggest the foregoing claim features. In the Office Action, the Examiner stated “Xu ‘444 teaches a resistor layer on top of the substrate (see column 6, lines 11-29). However, Xu does not teach that the resistor layer is an epitaxial layer.” Office Action, page 3. Instead, the Examiner relied solely on the Linthicum reference for an epitaxial layer. *See id.* Applicants respectfully submit that Xu does not teach or even suggests using a conductive material as a resistor layer. In fact, as evident from the name, the resistor layer is an electrically non-conductive or resistive layer and Xu teaches away from using an electrically conductive material in the resistor layer. For example, as mentioned in a passage cited at col. 6, lines 16-20, Xu teaches employing an electrically resistive layer. The passage reads:

Although conductive, the growth layer may have some resistance to regulate the emission current. Accordingly, a resistor layer may comprise a growth surface. Preferably, the resistor layer has a resistivity of about  $10^3$  to about  $10^{10}$  ohm-cm.

Accordingly, even if the field emission device of Xu was hypothetically formed by using the epitaxial buffer layers of Linthicum, the epitaxial buffer layers in the resultant device would be resistive in nature as opposed to the conductive buffer layers of the present claims. For this reason, the Xu and Linthicum references, taken alone or in hypothetical combination cannot support a *prima facie* case of obviousness of independent claim 30 and its dependent claims.

In addition, the Examiner has not shown the requisite motivation or suggestion to modify or combine the cited references to reach the present claims. As summarized above, the Examiner must provide objective evidence, rather than subjective belief and unknown authority, of the requisite motivation or suggestion to combine or modify the cited references. *In re Lee*, 61 U.S.P.Q.2d. 1430 (Fed. Cir. 2002). In the present rejection, the Examiner combined the cited references based on the *conclusory and subjective statement* that it would have been obvious “to one of ordinary skill in the art at the time of this invention to use an epitaxial layer (as in Linthicum) on the substrate of Xu in order to provide the resistivity that Xu desires (see Xu column 6, lines 11-29).” Office Action, page 3. The Applicants stress that the Examiner’s statement refers to resistivity rather than conductivity. Thus, the Applicants reiterate that there is no suggestion or motivation to modify the resistive layer of Xu to become conductive. Accordingly, Applicants respectfully request the Examiner to produce *objective evidence* of the requisite motivation or suggestion to combine the cited references, or remove the foregoing rejection under 35 U.S.C. § 103.

In addition to the complete lack of objective evidence, the Applicants stress the cited references teach away from one another and, therefore, are not properly combinable.

See *In re Grasselli*, 713 F.2d 731 at 743. Specifically, the Xu reference teaches away from a conductive buffer layer. Instead, the Xu reference teaches a resistive layer. Thus, the Xu reference cannot be modified or combined with the Linthicum references to obtain the “conductive epitaxial buffer layer,” as recited in the present claim. For at least this reason among others, the proposed combination is improper and must be withdrawn.

In view of the foregoing discussion, the Applicants respectfully stress that the Xu and Linthicum references, taken alone or in hypothetical combination, cannot support a *prima facie* case of obviousness of independent claim 30 and its dependent claims.

***Cited references, taken alone or in hypothetical combination, fail to teach or suggest a “epitaxial conductive buffer layer” as recited by independent claim 38.***

Independent claim 38 recites “an epitaxial conductive buffer layer disposed adjacent to the top side.” As discussed above with reference to independent claim 30, the Xu reference discloses a resistive layer rather than a conductive layer. Moreover, the Xu reference teaches away from a conductive layer. Therefore, even if the Xu and Linthicum references are hypothetically combined with one another, the result will be a resistive layer. As discussed in detail above, the Applicants respectfully request the Examiner to produce *objective evidence* of the requisite motivation or suggestion to combine the cited references, or remove the foregoing rejection under 35 U.S.C. § 103. In addition to the complete lack of objective evidence, the Applicants stress the cited references teach away from one another and, therefore, are not properly combinable. For at least these reasons, the Applicants respectfully stress that the Xu and Linthicum references, taken alone or in hypothetical combination, cannot support a *prima facie* case of obviousness of independent claim 38 and its dependent claims.

***Cited references, taken alone or in hypothetical combination, fail to teach or suggest a “conductive platform” as recited by independent claim 44.***

Claim 44 recites “a conductive platform, having a top surface, disposed on the top side of the substrate within the cavity.”

Applicants respectfully submit that the Examiner is mistaken in considering the catalyst metal film of Xu equivalent to the conductive platform of the present claims. Although Applicants do not intend or suggest that the specification should be read into the claims, the Applicants reiterate that the specification is “the primary basis for construing the claims.” *See Phillips v. AWH Corp.*, No. 03-1269, -1286, at 13-16 (Fed. Cir. July 12, 2005) (*en banc*). One should rely *heavily* on the written description for guidance as to the meaning of the claims. *See id.* As disclosed in the present application, the conductive platform facilitates the growth of the nanorods. *See* Application, paragraph 47, lines 1-3. The cited passage reads:

In another embodiment, a conductive platform 420, as shown in FIG. 4, may be disposed on the substrate 310 within a cavity formed in the dielectric layer 314.

Applicants respectfully submit that Xu does not teach or suggest any structure analogous to the conductive platform as recited in claim 44. In other words, Xu fails to teach or suggest any structure which is employed to raise the level of nanorods close to the gate opening. The metal catalyst film is used as a catalyst to enhance the growth of the nanostructures. For example, a passage at col. 12, lines 27-33 of Xu recites:

The use of a metal catalyst film is a preferred approach. The patterns are easy to form, uniform, and accurate with high reproducibility when a metal film is used. After a catalyst pattern is defined on a substrate surface, the patterned electron emitters are fabricated by further heating the substrate in an atmosphere containing a carbon source.

In view of these passages, the Applicants further note that the present application discloses a catalyst particle disposed within a channel in the conductive platform to facilitate the growth of the nanostructures. For example, a passage in paragraph 47, lines 3-5, of the present application discloses:

At least one channel 402 is formed in the conductive platform 420 and a catalyst particle 404 is placed within the channel 402. Nanorods 418 are then grown so as to extend from the top surface of the conductive platform 420.

Therefore, if at all, the metal catalyst film of Xu may be similar to the catalyst particles 404 in the foregoing passage, but the metal catalyst film of Xu cannot be equated with the conductive platform recited in the present claim.

The secondary references do not obviate the deficiencies of Xu. Hence, the hypothetical combination of Xu with Linthicum fails to disclose a “conductive platform,” as recited by independent claim 44. For at least these reasons, the Applicants respectfully stress that the Xu and Linthicum references, taken alone or in hypothetical combination, cannot support a *prima facie* case of obviousness of independent claim 44 and its dependent claims.

***Cited references, taken alone or in hypothetical combination, fail to teach or suggest a “polycrystalline conductive diffusion barrier” as recited by independent claim 54.***

Independent claim 54 recites “a polycrystalline conductive diffusion barrier affixed to the top side of the substrate.” As discussed above with reference to independent claim 30, the Xu reference discloses a resistive layer rather than a conductive layer. Moreover, the Xu reference teaches away from a conductive layer. Therefore, even if the Xu and Narayan references are hypothetically combined with one another, the result will be a resistive layer. Again, the Applicants respectfully request the Examiner to produce *objective evidence* of the requisite motivation or suggestion to combine the cited

references, or remove the foregoing rejection under 35 U.S.C. § 103. For at least these reasons, the Applicants respectfully stress that the Xu and Narayan references, taken alone or in hypothetical combination, cannot support a *prima facie* case of obviousness of independent claim 54.

***Cited references, taken alone or in hypothetical combination, fail to teach or suggest a “polycrystalline conductive diffusion barrier” as recited by independent claim 55.***

Independent claim 55 recites “a polycrystalline conductive diffusion barrier disposed adjacent to the top side.” As discussed above with reference to independent claims 30 and 54, the Xu reference discloses a resistive layer rather than a conductive layer. Moreover, the Xu reference teaches away from a conductive layer. Therefore, even if the Xu and Narayan references are hypothetically combined with one another, the result will be a resistive layer. Again, the Applicants respectfully request the Examiner to produce *objective evidence* of the requisite motivation or suggestion to combine the cited references, or remove the foregoing rejection under 35 U.S.C. § 103. For at least these reasons, the Applicants respectfully stress that the Xu and Narayan references, taken alone or in hypothetical combination, cannot support a *prima facie* case of obviousness of independent claim 55.

***Request Withdrawal of Rejections***

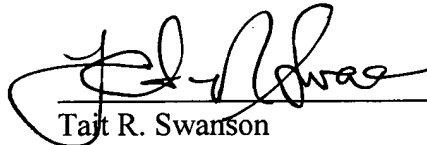
As discussed in detail above, the Xu reference is clearly missing features recited in the present claims, and the Linthicum and Narayan references fail to obviate these deficiencies. In fact, the Xu reference generally teaches away from a modification or combination with these references as discussed above. The Applicants further stress that the other references, i.e., Kane, Hunt, Jin, Takai, Rowell, and Laude, do not obviate the deficiencies of Xu. Therefore, Applicants request the Examiner to withdraw the rejections of these claims.

**Conclusion**

The Applicants respectfully submit that all pending claims should be in condition for allowance. However, if the Examiner believes certain amendments are necessary to clarify the present claims or if the Examiner wishes to resolve any other issues by way of a telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: June 13, 2006

A handwritten signature in black ink, appearing to read "Tait R. Swanson", is written over a horizontal line.

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